Question 1:

The kidneys in human beings are a part of the system for
(a) nutrition.
(b) respiration.
(c) excretion.
(d) transportation.

Answer 1:

(c) In human beings, the kidneys are a part of the system for excretion.

Question 2:

The xylem in plants are responsible for
(a) transport of water.
(b) transport of food.
(c) transport of amino acids.
(d) transport of oxygen.

Answer 2:

(a) In a plant, the xylem is responsible for transport of water.

Question 3:

The autotrophic mode of nutrition requires
(a) carbon dioxide and water.
(b) chlorophyll.
(c) sunlight.
(d) all of the above.

Answer 3:

(d) The autotrophic mode of nutrition requires carbon dioxide, water, chlorophyll and sunlight.

Question 4:

The breakdown of pyruvate to give carbon dioxide, water and energy takes place in

(a) cytoplasm.

(b) mitochondria.

(c) chloroplast.

(d) nucleus.

Answer 4:

(b) The breakdown of pyruvate to give carbon dioxide, water and energy takes place in mitochondria.

Question 5:

How are fats digested in our bodies? Where does this process take place?

Answer 5:

Fats are present in the form of large globules in the small intestine. The small intestine gets the secretions in the form of bile juice and pancreatic juice respectively from the liver and the pancreas. The bile salts (from the liver) break down the large fat globules into smaller globules so that the pancreatic enzymes can easily act on them. This is referred to as *emulsification* of fats. It takes place in the small intestine.

Question 6:

What is the role of saliva in the digestion of food?

Answer 6:

Saliva is secreted by the salivary glands, located under the tongue. It makes the food soft for easy swallowing. It contains a digestive enzyme called salivary amylase, which breaks down starch into sugar.

Question 7:

What are the necessary conditions for autotrophic nutrition and what are its by-products?

Answer 7:

Autotrophic nutrition takes place through the process of photosynthesis. Carbon dioxide, water, chlorophyll pigment, and sunlight are the necessary conditions required for autotrophic nutrition. Carbohydrates (food) and O_2 are the by-products of photosynthesis.

$$6CO_2 + 6H_2O \xrightarrow{Chlorophyll\ and\ Sunlight} C_6H_{12}O_6 + 6O_2$$

Question 8:

What are the differences between aerobic and anaerobic respiration? Name some organisms that use the anaerobic mode of respiration.

Answer 8:

Difference between Aerobic respiration and Anaerobic respiration:

	Aerobic respiration		***Anaerobic respiration***
1.	It occurs in the presence of O_2.	1.	It occurs in the absence of O_2
2.	It involves the exchange of gases between the organism and the outside environment.	2.	Exchange of gases is absent.
3.	It occurs in cytoplasm and mitochondria.	3.	It occurs only in cytoplasm.
4.	It always releases CO_2 and H_2O.	4.	It produces alcohols and CO_2.
5.	It yields large amount of energy.	5.	Energy released is very low.

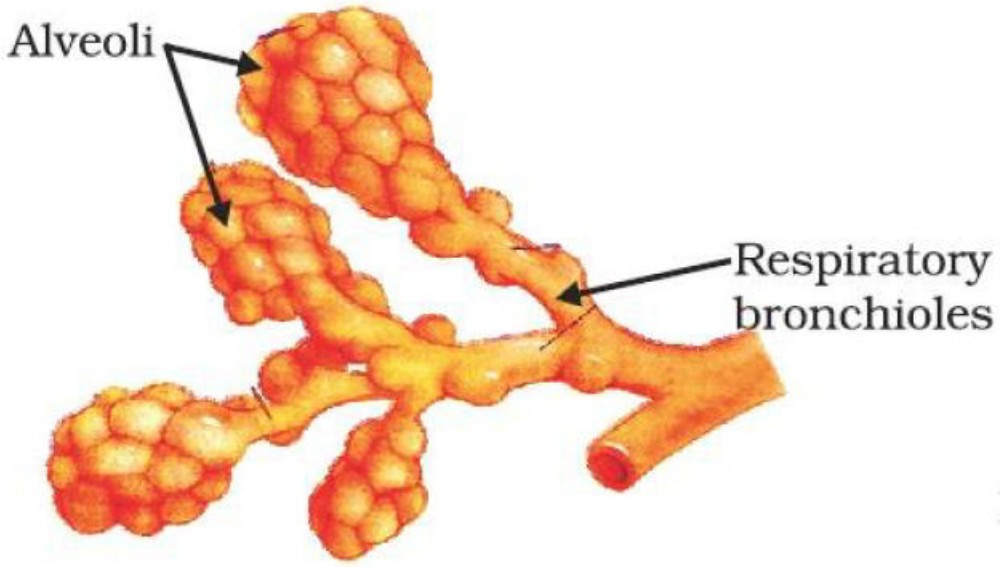
Anaerobic respiration occurs in the roots of some waterlogged plants, some parasitic worms, animal muscles and some micro-organisms such as yeasts.

Question 9:

How are the alveoli designed to maximise the exchange of gases?

Answer 9:

The alveoli are the small balloon-like structures present in the lungs. The walls of the alveoli consist of extensive network of blood vessels. Each lung contains 300−350 million alveoli, making it a total of approximately 700 million in both the lungs. The alveolar surface when spread out covers about 80 m^2 area. This large surface area makes the gaseous exchange more efficient.



Question 10:

What would be the consequences of a deficiency of haemoglobin in our bodies?

Answer 10:

Haemoglobin is the respiratory pigment that transports oxygen to the body cells for cellular respiration. Therefore, deficiency of haemoglobin in blood can affect the oxygen supplying capacity of blood. This can lead to deficiency of oxygen in the body cells. It can also lead to a disease called anaemia.

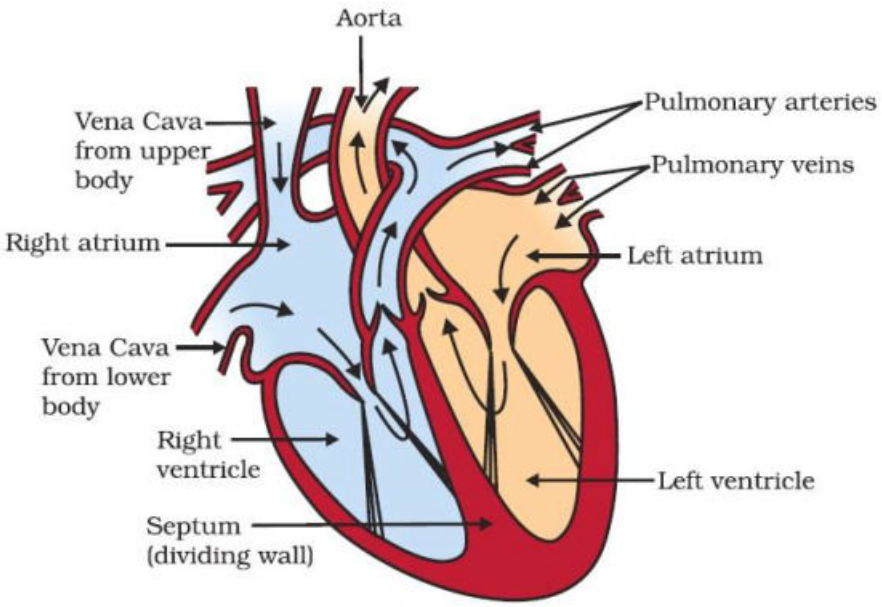
Question 11:

Describe double circulation in human beings. Why is it necessary?

Answer 11:

Because both oxygen and carbon dioxide have to be transported by the blood, the heart has different chambers to prevent the oxygen-rich blood from mixing with the blood containing carbon dioxide. The human heart is divided into four chambers − the right atrium, the right ventricle, the left atrium and the left ventricle.

Oxygen-rich blood from the lungs comes to the thin-walled upper chamber of the heart on the left, the left atrium. The left atrium relaxes when it is collecting this blood. It then contracts, while the next chamber, the left ventricle, expands, so that the blood is transferred to it. When the muscular left ventricle contracts in its turn, the blood is pumped out to the body.



De-oxygenated blood comes from the body to the upper chamber on the right, the right atrium, as it expands. As the right atrium contracts, the corresponding lower chamber, the right ventricle, dilates. This transfers blood to the right ventricle, which in turn pumps it to the lungs for oxygenation.

During this process blood goes twice through the heart. That's why it is known as double circulation.

Double Circulation is necessary:

The separation of oxygenated and de-oxygenated blood allows a more efficient supply of oxygen to the body cells. This efficient system of oxygen supply is very useful in warm-blooded animals such as human beings. As we know, warm-blooded animals have to maintain a constant body temperature by cooling themselves when they are in a hotter environment and by warming their bodies when they are in a cooler environment. Hence, they require more O_2 for more respiration so that they can produce more energy to maintain their body temperature.

Thus, the circulatory system of humans is more efficient because of the double circulatory heart.

Question 12:

What are the differences between the transport of materials in xylem and phloem?

Answer 12:

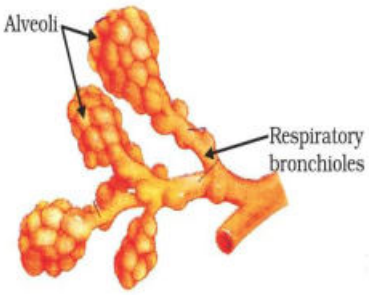
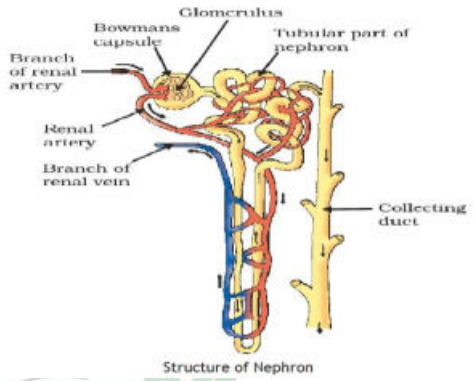
Difference between Xylem and Phloem:

	Xylem		*Phloem*
1.	Xylem tissue helps in the transport of water and minerals.	1.	Phloem tissue helps in the transport of food.
2.	Water is transported upwards from roots to all other plant parts.	2.	Food is transported in both upward and downward directions.
3.	Transport in xylem occurs with the help of simple physical forces such as transpiration pull.	3.	Transport of food in phloem requires energy in the form of ATP.

Question 13:

Compare the functioning of alveoli in the lungs and nephrons in the kidneys with respect to their structure and functioning.

Answer 13:

	Alveoli		*Nephron*
1.	Alveoli are tiny balloon-like structures present inside the lungs.	1.	Nephrons are tubular structures present inside the kidneys.
2.	The walls of the alveoli are one cell thick and it contains an extensive network of blood capillaries. 	2.	Nephrons are made of glomerulus, bowman's capsule, and a long renal tube. It also contains a cluster of thin walled capillaries.  Structure of Nephron
3.	The exchange of O_2 and CO_2 takes place between the blood of the capillaries that surround the alveoli and the gases present in the alveoli. Alveoli are the site of gaseous exchange.	3.	The blood enters the kidneys through the renal artery which branches into many capillaries in the glomerulus. The water and solute are transferred to the nephron at Bowman's capsule. Then the filtrate moves through the proximal tubule, distal tubule and collecting duct. The collecting duct collects the urine from many nephrons and passes it to the ureter. During the flow of filtrate, some substances such as glucose, amino acids, and water are selectively reabsorbed. Nephrons are the basic filtration unit.